

Centrifuge **SELEX**

User's Manual



MOOHAN

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1. Precautions

- ✓The instrument must be installed on a flat, stable, horizontal and solid surface.
- ✓Before operating the instrument, check if the rotor and the rotor lid are securely fastened.
- ✓Do not move the instrument when it is not completely stopped.
- ✓Operate with a stable & appropriate power inlet.
- ✓Do not place dangerous materials within 30cm distance around the instrument.
- ✓Only use rotors from moohan Co., Ltd. with appropriate tubes for centrifugation.
- ✓Do not use hazardous, inflammable or radioactive materials as samples.
- ✓When it is necessary to use toxic or radioactive materials or pathogenic micro-organisms which belong to the Risk Group II of WHO: "Laboratory Bio- safety Manual," follows national regulations.
- ✓Use the emergency door open function only when the door key on the control panel is not working.
- ✓The sample must be loaded weight-balanced way not to cause imbalance.
- ✓The density of sample material must not exceed 1.2g/ml at Max. RPM or RCF.
- ✓Any improper handling or any usage of un-qualified accessories is not able to be protected.

2. Technical Specifications 416G

➤Max. RPM	4,000 rpm
➤Max. RCF	2,700 xg
➤Max. capacity	15ml x 16
➤Run time	≤ 99 min 59 sec or continuous
➤Noise level	≤ 60 dB
➤Acceleration time	≤ 20 sec
➤Deceleration time	≤ 25 sec
➤Imbalance Recognition	Automatic
➤Motor	High torque AC induction motor
➤Safety	Lid-lock
➤Available Rotors	15mlx16, 50mlx4 (S)
➤Power & Frequency	220V, 50/60Hz
➤Dimension (WxDxH) mm	377 x 438 x 251
➤Weight	22 Kg
➤* Rotor: (S)-Swing rotor	

3. Installation

3-1. Delivery Checklist

- 3-1-1. Main body, 1ea
- 3-1-2. Power cable, 1ea
- 3-1-3. Emergency door open tool, 1ea
- 3-1-4. User's manual, 1ea
- 3-1-5. Rotor (Optional)

3-2. Unpacking the instrument

- 3-2-1. Open the box and lift out the instrument carefully together with the safety padding.
- 3-2-2. Remove the safety padding and vinyl wrap.
- 3-2-3. Place the instrument on the flat space.

3-3. Installation place

- 3-3-1. Install the machine at the solid and flat floor or table. If you place the centrifuge at the slope, the axis of rotation is possibly changed because of the rotor weight.
- 3-3-2. Install the machine about 30cm is departed from the wall because of the air circulation.
- 3-3-3. Install the machine at the place with appropriate temperature and humidity. It also has to be maintained with the proper temperature & humidity.
- 3-3-4. Install the machine at the place without any kinds of corrosive gases.

3-4. Supply the power

- 3-4-1. 416G model uses 110V or 220V. Check proper voltage of your instrument and connect to adequate power outlet.
- 3-4-2. If the power input is more than +/- 10% of the recommended voltage or fluctuating frequently, it may affect some functions of the instrument. It is advised to use AVR (Automatic Voltage Regulator).
- 3-4-3. If you want to use the instrument at other voltage range, please contact us.

3-5. On/off and the door open

- 3-5-1. Turn on the instrument by pressing the switch on the right side of the machine.
- 3-5-2. Press the 'Door' button to open the door.
- 3-5-3. Remove the protection materials inside the chamber.

3-6. Rotor coupling and disassembling

- 3-6-1. Mount the rotor fitting with the motor shaft.
- 3-6-2. Grasp the rotor with one hand, and rotate the rotor nut in the direction of clockwise, until it is tightly assembled.
- 3-6-3. Position the plastic lid properly and press slightly down to close.
- 3-6-4. The rotor lid is disclosed by lifting up the knob.
- 3-6-5. To disassemble the rotor, rotate the rotor nut in a counterclockwise direction.

4. Operation

4-1. Control Panel



4-1-1. Display FND: Shows the data of each function.

4-1-2. Up & down arrow: Uses to change input data.

4-1-3. Door: Uses to open the door.

4-1-4. RPM/RCF: Uses to switch the RPM/RCF display

4-1-5. TIME: Uses to set test time up to 99 min 59 sec (00: continuous)

4-1-6. START: Uses to start operation. The latest setting value is recalled if there is no new setting

4-1-7. STOP: Uses to stop operation

4-1-8. SOFT START & STOP: Uses to accelerate or decelerate slowly.

*If you press the arrow button longer than 3 seconds, the numbers change very rapidly and the set-up is achieved faster.

4-2. Function Description

4-2-1. RPM

Speed display unit : 1 rpm

Speed setting unit : 10 rpm

Speed accuracy : $<\pm 2\%$ (at maximum speed)

① Press the 'RPM/RCF' button.

② Press the arrow button to change input value.

4-2-2. RCF (Relative Centrifugal Force)

The conversion value from RPM to RCF is calculated automatically (based on the maximum radius and revolution)

① Press the 'RPM/RCF' button twice.

② Press the arrow button to change input value.

4-2-3. Time

Time display: 99 min 59 sec, 2 digit display

Time is down-counted after starting centrifugation.

① Press the 'TIME' button. The display shows the previous time value and the minute LED and value blinks.

② Press the arrow button to change the minute value.

③ Press the 'TIME' button again to set the second value, then the second LED and value blinks automatically.

④ Press the arrow button to change the second value.

* After finishing the setting, your input value is saved automatically in 2~3 seconds.

4-2-4. Soft Start & Stop

For the sensitive samples not to disturb contents by fast acceleration and deceleration, use SOFT START/STOP. Centrifuge is accelerated or decelerated slowly. Press SOFT START / STOP button instead of 'START' button to use this function.

4-2-5. Door

Press the 'Door' button to open the door. The door is not opened while the instrument is running.

4-2-6. START

Pressing the 'START' button, the operation is started to run with setting value.

4-2-7. STOP

Pressing the 'STOP', the operation is stopped to run in any case.

4-3. Operation Sequence

4-3-1. Connect the AC cord to the appropriate voltage.

4-3-2. Turn on the power switch located at the right side of the unit. Then the latest operating values are recalled with beeping sound.

4-3-3. Open the door and check the rotor.

4-3-4. Input the function values according to your preferences.

4-3-5. Press the 'START' button to start the operation.

4-3-6. As soon as the set-time is ended, the centrifugation will be ceased according to the set-deceleration level. If you want to interrupt before the set-time, press the 'STOP' button.

4-4. Miscellaneous Functions

4-4-1. In any cases needed for emergency open, you can use the emergency door open tool as long as the machine is idle. Insert the emergency tool into the emergency door open hole at the left-upside of the unit.

4-4-2. Imbalance Alarm: When the rotor is imbalanced and the vibration is severe, the operation is urgently stopped with the error message on the display and the alarming sound.

5. Maintenance

5-1. Outer part of instrument

5-1-1. Clean the outside of the machine with a dry soft cloth. If necessary, dip the cloth with neutral detergents and clean contaminated parts. Keep completely dry after cleaning.

5-1-2. Do not use any volatile chemicals such as alcohol, benzene, etc.

5-1-3. If any rust appears, clean with neutral detergents and dry it.

5-2. Inner part of instrument

5-2-1. Keep dry inside the chamber after every use of the machine.

5-2-2. Clean the shaft always for avoiding an imbalance during the rotation.

5-2-3. If any part is contaminated, clean with neutral detergents.

5-3. Rotor

5-3-1. Clean the rotor if any parts are contaminated with samples.

5-3-2. Keep dry after usage.

5-4. Moving or shipping of instrument

5-4-1. If you need to move or ship the instrument, be cautious to protect the shaft from any physical impact.

5-4-2. Remove the rotor and fill inside the chamber with proper materials to keep the shaft on place.

5-4-3. It is recommended to move or ship rotors separately if no original safety padding is available.

6. Trouble Shooting

Error	Possible Causes	Actions
E 1	Failure to reach to 200RPM within 2sec	Check the RPM sensor. Check the connection of a RPM connector or a wire.*
E 2	When running, the door is opened	Check the door latch. Stop running, power off and on.
E 3	Over temperature of motor	Check the motor temperature.
E 4	Low voltage	Check supply voltage. Use AVR to provide proper voltage.
E 5	High voltage	Check supply voltage. Use AVR to provide proper voltage.
E 6	Over speed	Stop running, power off and on. Tuning of the firmware(Download)*
E 7	Failure of control system	Stop running, power off and on. Tuning of the firmware(Download)*
E 8	Imbalance	Check amount of samples. Check weight-balances of samples.
E 9	RPM sensor recognition error	Check attached place of RPM sensor. Check connection of cable for RPM sensor. Change RPM sensor.